

DOCKET NO: 246070US26

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :
KOUJI MITSUHASHI, ET AL. : EXAMINER: RAKESH K. DHINGRA
SERIAL NO: 10/722,602 :
FILED: NOVEMBER 28, 2003 : GROUP ART UNIT: 1792
FOR: INTERNAL MEMBER OF A :
PLASMA PROCESSING VESSEL :

APPEAL BRIEF

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

This is an appeal from a final Office Action mailed June 26, 2009. A Notice of Appeal was filed on November 25, 2009.

I. REAL PARTY IN INTEREST

The real party in interest in this appeal is TOKYO ELECTRON LIMITED at 3-1, Akasaka 5-chome, Minato-ku, Tokyo 107-6325, Japan.

II. RELATED APPEALS AND INTERFERENCES

Appellants, Appellants' legal representative and the assignees are aware of no appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF THE CLAIMS

Claims 9, 10, 12, 14, 15, 31, 32, 38 and 39 are pending. Claims 1-8, 11, 13, 16-30, 33-37 are canceled. Claims 9, 10, 12, 14, 15, 31, 32, 38 and 39 stand rejected and are herein appealed. The attached Appendix VIII reflects 9, 10, 12, 14, 15, 31, 32, 38 and 39 involved in the appeal.

IV. STATUS OF THE AMENDMENTS

No amendments have been made after final action in this case.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

Independent Claim 9 recites an internal member of a plasma processing vessel (see, for example, Appellants' specification at Fig. 1 and p. 17, lines 8-11). The internal member includes a base material (see, for example, Appellants' specification at Figs. 2 and 6B, item 71; and paragraphs [0048] and [0069]), and a film (see, for example, Appellants' specification at Fig. 2, item 72 and Fig. 6B, item 77; and paragraphs [0048] and [0069]) formed on a surface of the base material. The film has a main layer (see, for example, Appellants' specification at Fig. 2, item 73 and Fig. 6B, item 78; and paragraphs [0048] and [0069]) formed by thermal spraying of ceramic and a barrier coat layer (see, for example, Appellants' specification at Fig. 2, item 74 and Fig. 6B, item 79; and paragraphs [0048] and [0069]) formed of ceramic including an element selected from the group consisting of B, Mg, Al, Si, Ca, Cr, Y, Zr, Ta, Ce and Nd. (see, for example, Appellants' specification at paragraph [0070]). The barrier coat layer is an intermediate layer formed between the main layer and the base material (see, for example, Appellants' specification at Fig. 2, item 74 and Fig. 6B, item 79; and paragraphs [0048] and [0069]), and the barrier coat layer is a thermally sprayed film (see, for example, Appellants' specification at p. 25, lines 15-19). At least parts of pores inside the barrier coat layer are sealed

by a resin provided at a lower portion of the barrier coat layer including a surface contacted with the base material and not including a surface contacted with the main layer (see, for example, Appellants' specification at p. 26, lines 14-22; Fig. 6B item 79a and paragraph [0072]).

VI. GROUND FOR REJECTION TO BE REVIEWED ON APPEAL

A. First Grounds of Rejection: Claims 9, 10, 15 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. 2002/0066532 to Shih et al., which is presented for review.

B. Second Grounds of Rejection: Claim 12 is rejected under 35 U.S.C. 103 (a) as being unpatentable over Shih et al. in view of US 4,357,387 to George et al. and US 6,724,140 to Araki, which is presented for review.

C. Third Grounds of Rejection: Claims 31 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shih et al. in view of US 2005/0150866 to O'Donnell et al., US 4,310,390 to Bradley and US 6, 120,955 to Tokutake et al., which is presented for review.

D. Fourth Grounds of Rejection: Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shih et al. in view of O'Donnell et al., Bradley et al. and Tokutake et al. and further in view of US 5,534,356 to Mahulikar et al., which is presented for review.

E. Fifth Grounds of Rejection: Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shih et al. in view of O'Donnell et al. and further in view of US 5,892,278 to Horita et al., which is presented for review.

F. Sixth Grounds of Rejection: Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shih et al. and further in view of O'Donnell et al., which is presented for review.

G. Seventh Grounds of Rejection: Claims 9, 10 and 12 are provisionally rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over co-pending application no 10/773,245 in view of Shih et al., which is presented for review.

VII. ARGUMENTS

A. The First Grounds of Rejection Is Improper and Should Be Reversed.

i. Claim 9 is not anticipated by Shih et al.

As noted above, Claim 9 recites that the barrier coat layer is an *intermediate layer formed between the main layer and the base material*, and that the barrier coat layer is a thermally sprayed film. Also recited is that at least parts of pores inside the barrier coat layer are sealed by a resin provided at a *lower portion of the barrier coat layer including a surface contacted with the base material and not including a surface contacted with the main layer*. An example embodiment covered by the claimed invention is shown in Fig. 6B of Appellants' specification. As seen in this figure, the thermally sprayed layer 79 is provided as a barrier layer due to the sealing treatment portion 79a which performs the barrier function. The layer 79 is an intermediate layer provided between layers 78 and 71, and the seal treated part 79a is provided in a lower part of the layer 79 in contact with the base 71, but not in contact with the layer 78. Paragraph [0068] of Appellants' specification explains that it is preferable to provide the seal portion within the film, but not on the surface of the film in order to avoid degradation of the seal and which can cause forming air pores in the film again.

The Office Action cites Shih et al. as teaching each of the above-noted features of Claim 9. Shih et al. discloses a corrosion resistant protective coating 30 formed on an interior surface of a processing chamber. As discussed in paragraph [0048] of Shih et al., the protective coating is either brushed or "sprayed" on the chamber wall. This reference to

“spraying” discloses a conventional spraying rather than thermal spraying, as required by the claims. This is confirmed by the fact that Shih et al. actually uses the term thermal or flame spraying with respect to ceramic layers provided on the chamber wall. Thus, Shih et al. does not disclose a thermally sprayed barrier layer as required by Claim 9.

In addition, Figures 11-13 of Shih et al. disclose the protective coating 30 formed either on an uncoated metal wall 20, or on a coated wall having ceramic layer(s) 24 and 28 thereon. Further, Figs 5-8 of Shih et al. show that the protective coating itself may be formed in two layers 30a and 30b. However, in Shih et al. does not disclose that an additional layer is formed on top of the protective coating such that the coating 30 is an intermediate layer. Therefore, Shih et al. also does not disclose that the protective coating is a “an intermediate layer” as required for the claimed barrier coat layer in Claim 9. Similarly, as the protective coating 30 or 30a, 30b is always on a top layer, the coating cannot be “a thermally sprayed film with at least parts of pores inside the barrier coat layer are sealed by a resin provided at a lower portion of the barrier coat layer including a surface contacted with the base material and not including a surface contacted with the main layer.”

Finally, the coating of Shih et al. is formed by applying the selected monomeric anaerobic mixture on the ceramic barrier layer 24 or the ceramic barrier coating 28. Thus, Applicants submit that one of ordinary skill in the art would not understand the coating 30 or 30a,30b to be “sealed by a resin” at all.

For the reasons discussed above, Shih et al. does not anticipate Claim 9.

ii. Claim 10 is also not anticipated by Shih et al.

The rejection of Claim 10 relies on Shih et al. for teaching the features of Claim 9. Therefore, Claim 10 is not anticipated for the reasons stated above with respect to Claim 9. Further, Claim 10 recites that the barrier coat layer is formed of at least one kind of ceramic selected from the group consisting of B₄C, MgO, Al₂O₃, SiC, Si₃N₄, SiO₂, CaF₂, Cr₂O₃, Y₂O₃,

YF₃, ZrO₂, TaO₂, CeO₂, Ce₂O₃, CeF₃ and Nd₂O₃. As noted above, the Office Action cites the protective layer 30 as teaching the barrier layer. However, the protective layer is a polymer.

Thus, Claim 10 provides an additional distinction over Shih et al.

iii. Claim 15 is also not anticipated by Shih et al.

The rejection of Claim 15 relies on Shih et al. for teaching the features of Claim 9. Therefore, Claim 15 is not anticipated for the reasons stated above with respect to Claim 9. Further, Claim 15 recites that the main layer is formed of at least one kind of ceramic selected from the group consisting of B₄C, MgO, Al₂O₃, SiC, Si₃N₄, SiO₂, CaF₂, Cr₂O₃, Y₂O₃, YF₃, ZrO₂, TaO₂, CeO₂, Ce₂O₃, CeF₃ and Nd₂O₃. As noted above, Shih et al. does not disclose any ceramic layer provided over the protective layer 30. Thus, Claim 15 provides an additional distinction over Shih et al.

B. The Second Grounds of Rejection Is Improper and Should be Reversed.

The rejection of Claim 12 relies on Shih et al. for teaching the features of Claim 9. Therefore, Claim 12 is not patentable for the reasons stated above with respect to Claim 9.

In addition, the Office Action admits that Shih et al. does not disclose the sealing resins of Claim 12, but concludes that this feature is obvious due to the resins in Araki et al. being “known equivalents” for sealing. However, it is well settled that the conclusion of equivalence without regard for obviousness. For example, as the U.S. Court of Customs and Patent Appeals noted in *In re Edge*, “the issue is not one of equivalence, but obviousness under 35 U.S.C. 103.”¹ Thus, Appellants submit that a prima facie case of obviousness has not been made for Claim 12, and this claims provides an additional basis for patentability.

C. The Third, Fourth, Fifth and Sixth Grounds of Rejection are Improper and Should be Reversed.

¹ See *In re Edge*, 149 USPQ 556, 557 (C.C.P.A. 1966).

The rejection of Claims 31, 38, 14, 32 and 39 rely on Shih et al. for teaching the features of Claim 9. Therefore, Claims 31, 38, 14, 32 and 39 are patentable for the reasons stated above with respect to Claim 9.

Further, the Office Action merely concludes that teachings of the dependent claims in the secondary references would be obvious to combine with Shih et al. However, the present inventors recognized that it is preferable to provide the seal portion between the main layer and base layer in order to provide a barrier function within the film, but not on the surface of the film in order to avoid degradation of the seal and which can cause forming air pores in the film again (see paragraph [0068] of Appellants' specification). Without this recognition provided in Appellants' specification, it would not be obvious for one of ordinary skill in the art to combine the teachings of the secondary references with Shih et al.

D. The Seventh Grounds of Rejection Is Improper and Should be Reversed.

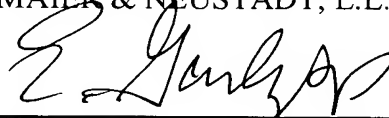
Finally, with respect to the provisional rejection of Claims 9, 10 and 12 for obviousness double patenting over Claims 5, 17-20 of co-pending Application No. 10/773,245 (US PG Pub. No. 2005/0103275), the Office Action relies on Shih et al. for teaching the features of Claim 9 which are absent from the double patenting reference. Therefore, the double patenting rejection is improper for the reasons stated above with respect to the prior art rejection of Claim 9.

CONCLUSION

For the reasons discussed above, all pending claims patentably define over the cited references. Therefore, the rejection should be reversed.

Respectfully submitted,

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VIII. CLAIMS APPENDIX

Claim 9: An internal member of a plasma processing vessel, comprising:

- a base material; and
- a film formed on a surface of the base material,

wherein the film has a main layer formed by thermal spraying of ceramic and a barrier coat layer formed of ceramic including an element selected from the group consisting of B, Mg, Al, Si, Ca, Cr, Y, Zr, Ta, Ce and Nd,

wherein the barrier coat layer is an intermediate layer formed between the main layer and the base material, and

wherein the barrier coat layer is a thermally sprayed film and at least parts of pores inside the barrier coat layer are sealed by a resin provided at a lower portion of the barrier coat layer including a surface contacted with the base material and not including a surface contacted with the main layer.

Claim 10: The internal member of claim 9, wherein the barrier coat layer is formed of at least one kind of ceramic selected from the group consisting of B_4C , MgO , Al_2O_3 , SiC , Si_3N_4 , SiO_2 , CaF_2 , Cr_2O_3 , Y_2O_3 , YF_3 , ZrO_2 , TaO_2 , CeO_2 , Ce_2O_3 , CeF_3 and Nd_2O_3 .

Claim 12: The internal member of claim 9, wherein the resin is selected from the group consisting of SI (silicone), PTFE (polytetrafluoroethylene), PI (polyimide), PAI (polyamideimide), PEI (polyetherimide), PBI (polybenzimidazole) and PFA (perfluoroalkoxyalkane).

Claim 14: The internal member of claim 31, wherein the sealing treatment is executed by using an element of the Group 3a in the periodic table.

Claim 15: The internal member of claim 9, wherein the main layer is formed of at least one kind of ceramic selected from the group consisting of B_4C , MgO , Al_2O_3 , SiC , Si_3N_4 , SiO_2 , CaF_2 , Cr_2O_3 , Y_2O_3 , YF_3 , ZrO_2 , TaO_2 , CeO_2 , Ce_2O_3 , CeF_3 and Nd_2O_3 .

Claim 31: The internal member of claim 9, wherein an anodic oxidized film is formed between the base material and the film, and

wherein at least parts of pores inside the anodic oxidized film are sealed by a second resin selected from the group consisting of SI (silicone), PTFE (polytetrafluoroethylene), PI (polyimide), PAI (polyamideimide), PEI (polyetherimide), PBI (polybenzimidazole) and PFA (perfluoroalkoxyalkane).

Claim 32: The internal member of claim 9, wherein an anodic oxidized film is formed between the base material and the film, and pores in the anodic oxidized film are sealed by an aqueous solution of metal salt.

Claim 38: The internal member of claim 31, wherein the main layer is formed of at least one kind of ceramic selected from the group consisting of B_4C , MgO , Al_2O_3 , SiC , Si_3N_4 , SiO_2 , CaF_2 , Cr_2O_3 , Y_2O_3 , YF_3 , ZrO_2 , TaO_2 , CeO_2 , Ce_2O_3 , CeF_3 and Nd_2O_3 .

Claim 39: The internal member of claim 9, a blast process is performed on the surface of the barrier coat layer to improve adhesivity with the main layer.

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.